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Der Präsident des Europäischen Patentamts;
Im Auftrag

For the President of the European Patent Office

Le Président de l'Office européen des brevets
p.o.

R C van Dijk



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If no title is shown please refer to the description.
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This invention relates to a metal container of the type having a body which is closed at one end by a peelable membrane or foil. In particular, it relates to a can body having a separate member fixed to one end and to
5 which the peelable component is adhered.

The usage of the sheet metal from which a container is manufactured is obviously of economic importance to the industry. For example, when the sheet metal is "blanked" to form ring-shaped components to which a
10 peelable component is applied, the material punched out of the middle is often discarded. Systems which reuse this blanked material in forming smaller sanitary (non-processed) can ends have been implemented but are inherently limited in the maximum size of ends which can
15 be produced. The size of the sanitary ends is also such that they cannot be used on the same container as the ring without the resultant container being "top-heavy" and unstable. If the containers used for the ring and end are manufactured in different volumes then there will
20 still be surplus of one of these and the manufacturing and mechanical handling logistics become difficult.

This invention seeks to provide a stable container which minimises metal usage and is readily handled during manufacture, filling and on shop shelves.

25 According to the present invention, there is provided a metal container comprising a base, a side wall and a ring component which is adapted to be closed by a peelable membrane or foil, the base and the ring component being formed from the same sheet metal, in
30 which the container side wall is flared outwardly at the

end to which the ring component is fixed by between 6 mm and 15%, has a central section of substantially constant cross-section, and is tapered inwardly at the base by between 2 mm and 22%. The preferred range of flare and/or
5 taper angle is 20° to 50° so as to minimise the length of material to be formed without compromising axial strength.

The maximum amount of flare for the upper end of the container is selected as that which provides ease of
10 filling without risking handling difficulties on the manufacturing line or supermarket shelves. The maximum taper at the bottom end is that which is possible without risk of instability of the container. However, a minimum amount of flare/taper is required if the ring component
15 and base are to be manufactured from the same sheet metal.

In a typical cylindrical container to hold between 80g and 500g of food the difference between upper diameter D_2 and the side wall diameter D_1 is from 6 mm to
20 12 mm and the difference between the end diameter D_3 and the upper diameter D_2 is from 14 mm to 28 mm. Preferably, the difference $D_2 - D_1$ is between 10 mm and 11 mm and the difference $D_2 - D_3$ is between 23 mm and 27 mm.

The ring component may generally include a flat
25 panel to which a peelable membrane is fixable, the flat panel preferably having a seal portion with a width of 2 to 6 mm. The cut edge of the ring portion may be curled either outwardly or inwardly so as to hide the cut edge.

For optimum product release, particularly when the
30 product is solid, such as pet food, the internal diameter

of the ring component for a cylindrical container may be the same as or greater than the diameter D_1 of the side wall.

For such products which need to be easily removed,
5 the diameter D_3 is ideally at least 15 mm smaller than the side wall diameter D_1 since this enables a ring component to be manufactured from the same material as the base, but having an internal ring diameter which is greater than or equal to the side wall diameter.

10 According to a further aspect of the present invention, there is provided a method of forming a container comprising: forming a cylindrical side wall; expanding the side wall at one end and necking the side wall at the opposite end; forming an intermediate
15 component having a seaming panel connected by a wall to a flat annulus, a substantially cylindrical wall portion and a centre panel; cutting the centre panel out of the intermediate component and curling the cylindrical wall to form a ring component; seaming the ring component to
20 the expanded end of the side wall and the centre panel to the necked end.

The step of forming the intermediate component may comprise forming can end features on the centre panel.

A preferred embodiment of the invention will now be
25 described, by way of example only, with reference to the drawing which is a schematic side view of one progression of forming a ring component and can end for seaming to the same can body.

Figure 1 shows a ring 1 for closing by a peelable
30 foil or membrane 2, a can body 3 and sanitary end 4. With

reference to figure 1(a) to 1(c), ring 1 and end 4 are formed from the same sheet metal 5 by drawing the metal sheet into a shallow cup 6 with flat annular portion 7 and wall 8 extending into a seaming panel 9 and
5 terminating in curl 10. Base 11 of the cup 6 is severed close to the cup wall 12 so as to form a stepped disc 13 which is subsequently to be used for forming the base of the container. The wall 12 is then curled adjacent annulus 7, thus forming a bond surface for fixing foil 2.
10 In the figure 1(c) this bonding surface 7 is shown as flat but it may be inclined if desired for pressure performance purposes, for example. In one embodiment, a tab 14 may be formed from the foil 2.

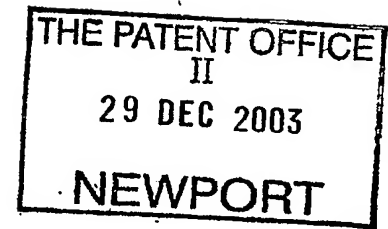
As shown in figure 1(d), the can body 3 is formed
15 from a cylinder of metal 15 which is expanded outwardly at one end 16 and necked inwardly at the opposite end 17. The body is provided with a flange 18, 19 at each end suitable for seaming the ring component 1 and can end 4 respectively.

20 Stepped disc 13, which was cut from the cup 6 (see figure 1(a) and 1(b)) is shallow drawn, curled and then seamed to the lower end of can body 3.

In accordance with the invention, the dimensions of the features are selected so as to enable the ring 1 and
25 end 4 to be manufactured from a single sheet of metal. In particular, dimensions are selected as defined in the claims. One container made in accordance with the invention has a 200 ml contained volume and has an 83 mm diameter peel seam ring, 73 mm body diameter and 58 mm

diameter end. Another container had a 73 mm diameter ring, 65 mm diameter body and 51 mm diameter end.

The example of the figure may be modified by forming the steps in a series of simple forming operations or by
5 carrying out one or more of the steps in a single machine. Furthermore, different shapes of formed components may be made so as to allow, say, the lower side of the sheet metal 5 to become the upper side of the ring 1 whilst remaining the lower side of end 4. This is
10 particularly useful where the coating on one side is a "soft" material selected for bonding the peelable foil to the ring, but a more robust material is preferred for the end which is in contact with the product.



CLAIMS:-

1. A metal container comprising a base, a side wall and a ring component which is adapted to be closed by a peelable membrane or foil, the base and the ring component being formed from the same sheet metal, in which the container side wall is flared outwardly at the end to which the ring component is fixed by between 6 mm and 15%, has a central section of substantially constant cross-section, and is tapered inwardly at the base by between 2 mm and 22%.
2. A container according to claim 1, in which the difference between upper diameter D_2 and the side wall diameter D_1 is from 6 mm to 12 mm and the difference between the end diameter D_3 and the upper diameter D_2 is from 14 mm to 28 mm.
3. A container according to claim 2, in which the difference $D_2 - D_1$ is between 10 mm and 11 mm and the difference $D_2 - D_3$ is between 23 mm and 27 mm.
4. A container according to any one of claims 1 to 3, in which the ring component includes a generally flat panel to which a peelable membrane is fixable, the flat panel having a seal width of 2 mm to 6 mm.

5. A container according to any one of claims 2 to 4, in which the internal diameter of the ring component is the same as or greater than the diameter D_1 of the side wall.
6. A container according to claim 5, in which the diameter D_3 is at least 15 mm smaller than the side wall diameter D_1 .
7. A method of forming a container according to any one of claims 1 to 6, the method comprising:
 - forming a cylindrical side wall;
 - expanding the side wall at one end and necking the side wall at the opposite end;
 - forming an intermediate component having a seaming panel connected by a wall to a flat annulus, a substantially cylindrical wall portion and a centre panel;
 - cutting the centre panel out of the intermediate component and curling the cylindrical wall to form a ring component;
 - seaming the ring component to the expanded end of the side wall and the centre panel to the necked end.
8. A method according to claim 7, in which the step of forming the intermediate component comprises forming can end features on the centre panel.

-8-

ABSTRACT

CONTAINER

A container for food which is closed by a peelable membrane at one end and a sanitary end at the opposite end. The container has a ring to which the membrane is fixed, the ring and sanitary end being formed from the same sheet metal. In order to make this possible, the container body flares outwardly at the end to which the ring is fixed and is necked at the opposite end. Dimensions are selected so that the resultant container is not only stable but also readily handled during manufacture, filling and on supermarket shelves.

(Figure 1)

Figure 1

